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**Estimated Volume and Energy Content of Biomass
and Municipal Solid Waste Resources in Missouri**

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by

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INTRODUCTION

There are large volumes of unused and/or under utilized resources in Missouri that could be more effectively used for energy or other purposes. This research project was initiated to estimate the volumes of resources available in each county on an annual basis in Missouri. All data were obtained from secondary sources, as described in each of the following sections.² The volume of resources and energy content were estimated for the following:

- Crop residues,
- Energy crops that could be produced on idle CRP lands,
- Wood residues from logging,
- Wood residues from primary wood processing,
- Municipal solid waste (MSW), and
- Used tires.

This report does not include standing timber which is an extremely important potential biomass resource in the state. However, quantification of this resource is done periodically by the U.S. Forest Service in cooperation with state officials, and thus is beyond the scope of this report.

FEEDSTOCKS

Crop Residues

¹ The authors are Research Associate Professor and Professor, respectively. Assistance was provided by: Ms. Kim Fender, Mr. Katenda Pashi and Mr. Youn-Sang Choi.

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The volume of crop residues was estimated for corn, soybeans, wheat and grain sorghum (milo) for each county in Missouri on an annual basis. First, the relationship between grain and residue was identified for each crop from secondary sources. For instance, corn has a one-to-one ratio, meaning that for each pound of corn (grain), there would be an estimated one pound of residue. Since each bushel of corn weighs 56 pounds, there would be an estimated 56 pounds (dry matter basis) of corn residue (ASA Special Publication No.31). The straw/grain relationship for each of the four crops is as follows:

<u>Crop</u>	<u>Ratio (straw/grain)</u>	<u>Pounds of grain/bushel</u>
Corn	1.0	56
Sorghum	1.0	56
Wheat (winter)	1.7	60
Soybeans	1.5	60

Next, the production level of each crop was estimated for each county in Missouri. This was done by averaging the annual acres harvested (on a county basis) from 1984 through 1994, excluding 1993 because of severe and widespread flooding (Missouri Agricultural Statistics Service). The relatively long period was studied in an attempt to minimize any potential bias that may have resulted from provisions of federal farm programs or other factors, regardless of what they might have been. The average yields for each crop by county were developed for the same time period. The average straw-to-grain ratios listed above were multiplied by the average yield, which was multiplied by the average number of acres. This provides an estimated volume of residue for each crop for each county in the state. The energy value for crop residues is, **6,500 Btus per pound** (dry matter weight).

Total residue production for the four crops is estimated at almost 17.8 million tons annually (**Appendix A**). The percent of total residue produced by corn, soybeans, grain sorghum and wheat are 36, 37, 10 and 17, respectively. Thus, corn and soybeans contribute almost equal volumes of residue in Missouri annually, although there are more than twice as many acres of soybeans (4.7 million acres) than there are of corn (2.2 million acres). It should also be noted that when soybeans are harvested, residue is shattered and economic collection of much of it is unlikely. Thus, slightly more than one-third of the total annual residue produced in Missouri annually is not collectable with current recovery equipment and machinery.

These estimates indicate the average total residues produced annually for each crop. Obviously, not all the residues can or will be recommended for removal from the land. Thus, responsible use of residues for energy or other purposes requires a sound management policy that allows sustainable crop production. While this factor is of extreme importance, it is beyond the scope of this study.

Energy Crops on CRP Lands

The two most common types of energy crops that might be produced on idled land in Missouri are switchgrass and hybrid poplars. Switchgrass and hybrid poplars are assumed to have energy values of 7,700 **and 8,200 Btus per pound**, respectively (EPRI). This compares to an energy content of 6,500 Btus per pound for crop residues. Yields would be expected to vary with the quality of land and geographic areas in the state. Thus, average per acre yields were calculated for 5, 7 and 10 tons annually.

The number of CRP acres on a county basis are identified in Appendix B. They include acres in the original signups of 1 through 12 minus some land that was removed from the program early. A total of 1.4 million of the original 1.6 million acres are included in this analysis. While the number of acres in CRP will change over time, this is believed to approximate the amount of idle and/or underutilized land in Missouri on a long-term basis.

The most conservative estimate of 5 tons per acre annually is believed to also be the most realistic. At this level, idled land in the state could be used to produce an estimated 7.1 million tons (dry matter basis) of either switchgrass or hybrid poplars annually. If an average of 10 tons per acre annually could be attained, total annual production in Missouri would be over 14 million tons, although this level is highly unlikely.

Wood Harvesting Residues

Harvesting residues are the materials (limbs, branches, and other residues) that are not recovered when logging occurs. While these residues have considerable energy content, they may -- or may not -- be economically recoverable. These county level data are from the most recent USDA Forest Service database conducted in the 1994 calendar year. These estimates are expressed in thousands of cubic feet of "green" residues for each species of trees. An estimated 85.6 million cubic feet of logging residues were available in 1994 (Appendix C). The majority of tree harvesting in the state is of hardwoods, which have an energy value of approximately 8,500 Btus per pound on a dry matter basis. Since the residues will be "green" a value of 4,700 **Btu per pound** is used for hardwood.³

Conversion of cubic feet to weight was developed as follows:

1 cord of white oak weighs 5,600 pounds,
1 cord of white oak measures 78 cubic feet,
Thus, there are 71.79 pounds per cubic feet,
And, with 4,700 Btu/# * 72 #cubic ft = **338,400 Btu/cord** for hardwoods,
Or, with 4,900 BtuI# * 72#/cubic ft = **352,800 Btu/cord** for softwoods.

³The Btu energy content and conversion factors were estimated by Mr. Shelby Jones, Department of Conservation, State of Missouri, Summer 1997.

Primary Wood Processing

Primary wood processing residues are basically those occurring at sawmills. Course residues include slabs and ends of logs, while fine residues are primarily sawdust. There were an estimated 24 thousand tons (green weight) of softwood and 202 thousand tons of hardwood residues generated in Missouri in 1994 (Appendix C).

The energy content of primary wood processing residues are estimated as follows:

Course and fine	4,500 Btu/# for hardwoods and 4,700 Btu/# for softwoods
Bark	4,700 Btu/# for hardwoods and 4,900 Btu for softwoods

Secondary Wood Processing

No current inventory of secondary wood is currently available, thus while it is a potentially important source of feedstocks for energy or other uses, it cannot be estimated because of lack of current data. This is especially important because all would be located at the point of processing, and thus potentially available for use with no or minimal additional collection costs.

Municipal Solid Waste (MSW)

The tonnages of MSW used in this study are for the period of April 1, 1996 through March 31, 1997. These data include paper, glass, metal, plastics, organics and inorganics. Materials that could be converted into ethanol, chemicals or other products via fermentation include paper and organics. Or, those that could be burned include paper, organics and plastics. Thus, the energy value of MSW depends on the type of use intended. The energy content of MSW used in this analysis is 5,000 **Btu per pound** (Blase, M.G., Editor).

During this one year period 4.3 million tons of MSW were disposed of in landfills and/or moved through transfer stations (Appendix D). Besides this 4.3 million tons, quantities of Missouri-derived MSW estimated to be about one million additional tons, were shipped directly out of state. The percentage composition of MSW in Missouri was based on sorts of MSW in the landfills of 10 towns in various areas of Missouri. This study was conducted for the Solid Waste Management Program, Missouri Department of Natural Resources in 1996. The selected waste haulers served only residential and commercial accounts, and no construction and demolition wastes, sewage sludge, bulky items, combustion ash, or industrial process waste was sampled. Since exact percentages of waste by category are not available for all landfills and transfer stations, a simple average of the percentages from the 10 study sites has been used as a state-wide average in Appendix D. For instance, the volume of paper (as a percent of total MSW weight in the sample) in the 10 locations ranged from 28.5 percent in Maryville to 41.4 percent

in Lee's Summit, with an average of 36.7 percent. Thus, this unweighted average may not be accurate for all locations, or it also may not be accurate for all seasons of the year. Nevertheless, it was the methodology used in estimating the percentage of total MSW comprised of the various types of waste.

Of the total amount of MSW identified in Appendix D, almost 37 percent was paper, while almost 31 percent was organic materials. The percent of MSW for each of the other categories include:

glass, 6 percent; metal almost 7 percent; plastic 14 percent; and inorganic, 5 percent. So, approximately 82 percent of Missouri MSW appears to be potentially combustible.

An important factor in the MSW data, as mentioned previously, is that it does not include industrial waste which can range from 30 to 60 percent of the total solid waste stream. Also, the tonnage of waste is reported by landfills and transfer stations. Thus it reflects the amount of waste that flows through, or is landfilled in various counties. It does not represent the amount of waste generated in any one county.

Tires

Old tires that are no longer of use for automobiles, trucks, etc. represent a tremendous problem for landfills as well as other disposal problems. However, they also represent a unique opportunity to supply energy, primarily because of their very high energy content. Three categories of used and disposed tires are identified in this database, including: 1) those disposed of in unpermitted dumps; 2) those disposed of in permitted dumps; and 3) tires that are expected to be disposed of annually. Tires disposed of in unpermitted dumps represent about 4.6 million as of August 18, 1997 (Appendix E).

An estimated 1.6 million tires have been disposed of in permitted tire dumps in five counties in Missouri (Appendix E). Thus, the stock of tires in permitted facilities and unpermitted dumps in Missouri is estimated at 6.24 million.

The number of tires discarded annually in Missouri varies from year to year and are difficult to identify. However, the method currently used by state personnel to estimate the number of tires disposed of is to assume that one tire is disposed for each resident each year. Thus, the volume of tires disposed of annually for each county in Missouri is basically the number of residents in that county as identified in the 1990 Census of Population. Accordingly, there are an estimated slightly more than 4.6 million tires disposed of annually in Missouri (Appendix E).

While there is a wide range of sizes (and weights) of waste tires, analysts generally estimate that there are about 100 automobile tires per ton, or about 20 pounds per tire. Thus, 20 pounds per tire is used in this database. Also, some of the weight of a tire is the steel used for reinforcing, which is estimated at about 30 percent of the total tire weight. Thus, a 20-pound tire, minus 30 percent for the steel reinforcement leaves a net weight of 14 pounds. The energy content of rubber tires is estimated at **14,000 btu per pound**.

ENERGY CONTENT OF BIOMASS, MSW AND USED TIRES

A summary of the volumes of biomass and other potential energy resources for each Missouri county and the City of St. Louis is provided in Appendix F. Since each of these potential resources is identified in different physical units, no attempt is made at this point to discuss total volumes, etc. The next phase of this database involves converting the physical units into energy values (Btu basis) which are common among the various potential feedstocks.

There are large volumes of energy contained in biomass in Missouri. Estimates developed in this study indicate that there are 409,377,061 million Btus in those potential feedstocks (Appendix G, page G-5). The following items seem to be of greatest importance in analyzing and interpreting data and information results included in this database:

- Over one-half the potential Btus (56%) are from crop residues, but not all the residues could be removed from land and still maintain long-run sustainability. The volume that could be safely removed depends on many factors that are beyond the scope of this database report,
- Dedicated energy crops produced on CRP land could produce almost 27 percent of the total Btus available to Missouri on an annual basis. However, this resource would be more expensive than that derived from other sources. Also, Federal laws would need to be changed to allow the harvesting and use of biomass from idled CRP Lands,
- An important potential biomass resource that is not included in this database is standing timber in the state. This information is available from the USDA, Forest Service database,
- A significant volume of the residues identified in this database may not be economically collectable, including the following for various reasons:
 - Wood harvesting residues -- these include treetops and limbs that are left when harvesting logs. They are scattered throughout the log harvesting areas.
 - Crop residues -- most of the wheat residue should be economically collectable, but that from other crops such as corn, soybeans and grain sorghum may not be harvestable because of adverse weather that occurs after grain harvest.
- Finally, these are annual estimates that may change as the level of crop production, wood harvesting and other changes occur that would result in changes in biomass availability during the year.

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APPENDIX TABLES

Table 1 -- Estimated volume of corn, grain sorghum, soybean and wheat residues produced annually in Missouri.

COUNTIES	CORN			Sorghum			Soybeans		
	Acres Harvested*	Yield Per Acre (bu)*	Tons of Residue	Acres Harvested*	Yield Per Acre (bu)*	Tons of Residue	Acres Harvested*	Yield Per Acre (bu)*	Tons of Residue
ADAIR	14,680	94.74	38,942	1,367	76.40	2,924	39,030	28.61	50,249
ANDREW	39,260	96.44	106,015	4,140	75.28	8,726	65,110	31.67	92,792
ATCHISON	109,310	111.91	342,521	2,667	90.64	6,768	110,330	36.28	180,125
AUDRAIN	40,130	103.80	116,634	36,970	89.37	92,509	139,000	30.51	190,840
BARRY	545	76.66	1,170	1,575	65.23	2,877	1,655	22.65	1,687
BARTON	8,000	108.10	24,214	27,750	83.10	64,569	70,580	26.52	84,230
BATES	28,620	86.45	69,278	22,430	78.03	49,006	74,440	27.48	92,053
BENTON	5,220	94.08	13,751	5,460	86.84	13,276	14,710	30.95	20,487
BOLLINGER	10,370	99.25	28,818	7,940	76.61	17,032	14,440	28.14	18,285
BOONE	13,520	95.03	35,975	3,890	82.86	9,025	41,980	30.76	58,109
BUCHANAN	34,710	107.98	104,944	3,830	76.35	8,188	53,590	32.77	79,026
BUTLER	7,920	111.87	24,808	40,030	71.27	79,882	77,160	29.01	100,729
CALDWELL	20,220	90.42	51,192	4,130	69.13	7,994	50,440	28.79	65,348
CALLAWAY	15,270	102.96	44,022	10,740	86.48	26,006	47,680	31.86	68,359
CAMDEN	417	80.62	941	183	56.17	288			0
CAPE GIRARDEAU	31,780	104.07	92,606	9,390	81.67	21,473	44,160	32.08	63,749
CARROLL	54,040	111.45	168,637	6,420	78.08	14,036	124,290	32.32	180,767
CARTER	175	79.85	391	400	51.07	572			0
CASS	22,370	92.55	57,970	11,010	77.09	23,765	60,460	31.18	84,831
CEDAR	700	81.03	1,588	1,250	62.26	2,179	4,650	26.10	5,461
CHARITON	53,570	107.86	161,786	5,690	79.64	12,688	123,630	32.66	181,699
CHRISTIAN	610	81.22	1,387	267	50.63	378			0
CLARK	45,880	98.10	126,023	900	73.23	1,845	64,890	29.56	86,317
CLAY	8,250	98.56	22,767	2,225	75.22	4,686	22,530	31.38	31,815

COUNTIES	CORN			Sorghum			Soybeans		
	Acres Harvested*	Yield Per Acre (bu)*	Tons of Residue	Acres Harvested*	Yield Per Acre (bu)*	Tons of Residue	Acres Harvested*	Yield Per Acre (bu)*	Tons of Residue
CLINTON	24,440	98.84	67,638	3,055	76.70	6,561	37,860	32.50	55,370
COLE	6,050	100.19	16,972	1,655	73.83	3,421	6,170	34.03	9,448
COOPER	35,470	99.89	99,207	7,050	79.88	15,768	51,000	32.86	75,414
CRAWFORD	669	68.18	1,277	980	68.20	1,871	750	33.40	1,127
DADE	1,630	86.69	3,957	6,340	76.70	13,616	21,740	24.68	24,144
DALLAS	183	71.58	367	3,655	55.13	5,642			0
DAVIESS	26,530	92.94	69,040	12,200	77.62	26,515	82,920	29.54	110,226
DE KALB	24,320	91.47	62,287	5,540	74.40	11,541	39,480	30.11	53,493
DENT	775	79.35	1,722	267	54.73	409	792	27.08	965
DOUGLAS	200	67.50	378	367	48.33	496			0
DUNKLIN	6,550	126.20	23,145	33,940	76.44	72,642	98,060	27.39	120,864
FRANKLIN	19,890	93.60	52,128	4,290	67.73	8,136	14,340	31.06	20,043
GASCONADE	8,200	86.93	19,959	3,110	66.13	5,759	5,010	31.76	7,160
GENTRY	29,610	96.44	79,956	4,300	71.16	8,568	54,730	31.31	77,112
GREENE	790	79.24	1,753	775	52.53	1,140	1,083	25.33	1,235
GRUNDY	14,500	98.91	40,157	7,540	82.30	17,375	72,940	30.23	99,224
HARRISON	41,030	98.16	112,770	3,730	72.78	7,601	63,270	30.86	87,863
HENRY	15,300	88.19	37,781	20,530	80.04	46,010	42,230	28.49	54,141
HICKORY	625	78.96	1,382	1,090	63.82	1,948	1,475	26.19	1,738
HOLT	77,950	110.05	240,195	2,310	78.25	5,061	101,080	34.43	156,608
HOWARD	26,300	101.76	74,936	2,535	78.80	5,593	35,720	33.51	53,864
HOWELL	344	83.22	803	300	47.10	396			0
IRON	100	72.35	203	250	66.67	467			0
JACKSON	11,650	100.65	32,832	3,575	79.57	7,965	36,120	32.84	53,378

COUNTIES	CORN			Sorghum			Soybeans		
	Acres Harvested*	Yield Per Acre (bu)*	Tons of Residue	Acres Harvested*	Yield Per Acre (bu)*	Tons of Residue	Acres Harvested*	Yield Per Acre (bu)*	Tons of Residue
JASPER	3,210	98.13	8,820	11,910	74.01	24,681	34,650	23.90	37,266
JEFFERSON	3,290	91.64	8,442	1,183	65.18	2,160	6,250	29.47	8,288
JOHNSON	26,540	94.45	70,188	17,340	77.58	37,667	49,020	31.17	68,758
KNOX	28,300	92.48	73,281	2,045	81.57	4,671	70,960	29.56	94,391
LACLEDE	1,130	86.37	2,733	600	63.77	1,071	617	20.47	568
LAFAYETTE	75,520	112.04	236,915	2,695	77.23	5,828	93,850	35.58	150,263
LAWRENCE	1,365	83.70	3,199	3,430	55.09	5,291	7,710	23.49	8,150
LEWIS	39,360	98.23	108,257	2,622	83.26	6,113	63,540	30.35	86,780
LINCOLN	44,210	97.29	120,433	4,400	82.87	10,210	45,220	29.65	60,335
LINN	20,640	99.40	57,445	6,130	80.65	13,843	63,610	30.11	86,188
LIVINGSTON	15,070	97.72	41,234	9,400	81.92	21,561	99,130	30.27	135,030
MCDONALD	200	62.50	350	250	45.37	318	0	0.00	0
MACON	22,800	95.85	61,191	5,190	75.57	10,982	75,940	29.13	99,546
MADISON	750	77.13	1,620	640	66.90	1,199	688	24.73	765
MARIES	2,010	84.16	4,737	1,250	64.38	2,253	1,017	23.53	1,077
MARION	33,320	105.62	98,539	4,940	78.82	10,902	55,790	31.51	79,107
MERCER	19,110	99.09	53,021	1,528	71.14	3,043	28,830	30.23	39,219
MILLER	2,970	100.05	8,320	1,220	69.84	2,386	1,520	30.31	2,073
MISSISSIPPI	48,300	135.51	183,264	27,050	94.59	71,642	145,530	34.88	228,424
MONITEAU	10,660	88.63	26,454	5,720	76.57	12,263	14,110	30.90	19,620
MONROE	20,590	91.59	52,803	25,910	86.27	62,587	77,960	28.25	99,107
MONTGOMERY	32,140	97.86	88,066	5,490	81.19	12,481	51,290	28.29	65,295
MORGAN	5,900	93.42	15,433	2,940	76.00	6,256	8,140	31.15	11,410
NEW MADRID	43,950	137.98	169,798	65,090	88.93	162,077	172,360	31.81	246,725

COUNTIES	CORN			Sorghum			Soybeans		
	Acres Harvested*	Yield Per Acre (bu)*	Tons of Residue	Acres Harvested*	Yield Per Acre (bu)*	Tons of Residue	Acres Harvested*	Yield Per Acre (bu)*	Tons of Residue
NEWTON	478	80.12	1,072	1,665	56.01	2,611	6,460	22.70	6,599
NODAWAY	107,270	98.57	296,061	2,880	68.20	5,500	126,810	32.17	183,576
OREGON	50	62.00	87	133	55.23	206			0
OSAGE	7,860	104.22	22,937	2,630	77.53	5,709	6,710	34.50	10,417
OZARK	75	62.50	131	150	47.33	199			0
PEMISCOT	14,230	122.56	48,833	26,650	81.74	60,994	164,920	31.47	233,551
PERRY	26,140	104.88	76,764	3,075	76.29	6,569	27,510	32.71	40,493
PETTIS	28,730	96.06	77,275	21,050	83.93	49,468	67,270	31.28	94,689
PHELPS	1,250	82.74	2,896	883	59.30	1,467	800	22.80	821
PIKE	42,510	100.80	119,980	9,250	91.54	23,709	60,600	30.58	83,392
PLATTE	24,510	104.50	71,716	6,480	81.26	14,744	45,980	32.86	67,991
POLK	1,105	88.28	2,731	950	70.94	1,887	1,715	27.45	2,118
PULASKI	739	82.18	1,700	183	62.10	319	700	22.23	700
PUTNAM	13,750	97.27	37,449	1,567	61.83	2,712	18,400	29.63	24,534
RALLS	22,470	95.74	60,236	11,810	93.27	30,843	69,060	30.09	93,511
RANDOLPH	15,020	91.94	38,666	3,130	80.69	7,072	41,280	29.14	54,130
RAY	26,640	109.46	81,648	4,720	74.39	9,831	82,400	31.84	118,063
REYNOLDS	475	79.36	1,056	283	57.87	459			0
RIPLEY	275	74.05	570	6,700	70.66	13,256	9,540	26.43	11,346
ST CHARLES	42,910	116.00	139,372	1,555	82.04	3,572	55,690	34.48	86,409
ST CLAIR	5,230	89.28	13,074	11,130	74.78	23,304	20,550	27.35	25,292
ST GENEVIEVE	12,830	103.47	37,171	1,944	74.70	4,067	9,450	35.53	15,109
ST FRANCOIS	2,480	86.90	6,034	1,030	64.52	1,861	1,015	30.15	1,377
ST LOUIS	4,890	108.26	14,823	983	61.17	1,684	10,990	30.86	15,262

COUNTIES	CORN			Sorghum			Soybeans		
	Acres Harvested*	Yield Per Acre (bu)*	Tons of Residue	Acres Harvested*	Yield Per Acre (bu)*	Tons of Residue	Acres Harvested*	Yield Per Acre (bu)*	Tons of Residue
SALINE	100,490	113.18	318,457	4,180	80.01	9,364	123,800	36.05	200,835
SCHUYLER	11,000	95.23	29,331	833	62.80	1,465	16,680	29.19	21,910
SCOTLAND	34,740	93.77	91,212	1,033	69.47	2,010	48,860	29.39	64,620
SCOTT	44,850	126.20	158,482	22,900	85.82	55,028	89,700	30.68	123,840
SHANNON	200	67.50	378	117	56.67	185			0
SHELBY	30,180	97.83	82,670	11,580	88.14	28,579	86,840	30.03	117,351
STODDARD	83,120	129.48	301,347	56,810	84.95	135,128	150,100	31.33	211,618
STONE	100	62.50	175	217	48.70	295			0
SULLIVAN	13,310	90.83	33,851	1,633	69.72	3,189	30,910	28.40	39,503
TANEY	50	62.00	87	450	46.77	589			0
TEXAS	810	86.46	1,961	483	52.50	711			0
VERNON	17,320	91.66	44,451	30,780	79.24	68,292	67,280	25.43	76,992
WARREN	20,610	104.00	60,016	1,975	72.50	4,009	20,800	30.15	28,220
WASHINGTON	458	66.63	855	383	61.20	657			0
WAYNE	1,620	93.77	4,253	2,080	62.21	3,623	4,940	25.41	5,649
WEBSTER	550	86.89	1,338	125	58.25	204			0
WORTH	14,890	92.49	38,561	975	72.73	1,985	21,880	29.26	28,809
WRIGHT	400	63.77	714	200	52.33	293			0
STATE TOTAL	2,215,000	104.70	6,492,187	784,000	81.90	1,824,327	4,668,000	31.05	6,517,489

* Averages based on 1984-92 and 94

COUNTIES	Wheat			Total Residues
	Acres Harvested*	Yield Per Acre (bu)*	Tons of Residue	
ADAIR	4,720	37.67	9,068	101,183
ANDREW	6,800	38.74	13,435	220,968
ATCHISON	2,840	39.82	5,768	535,181
AUDRAIN	42,710	45.76	99,675	499,658
BARRY	1,675	37.63	3,215	8,948
BARTON	47,390	39.43	95,298	268,311
BATES	29,760	41.18	62,501	272,837
BENTON	6,170	41.32	13,002	60,516
BOLLINGER	4,985	36.80	9,356	73,491
BOONE	16,880	40.67	35,012	138,120
BUCHANAN	11,770	37.37	22,432	214,590
BUTLER	16,800	38.43	32,927	238,346
CALDWELL	13,230	38.30	25,842	150,376
CALLAWAY	19,740	41.83	42,112	180,499
CAMDEN	550	32.50	912	2,140
CAPE GIRARDEAU	16,580	37.28	31,523	209,351
CARROLL	36,450	41.54	77,221	440,661
CARTER	250	32.15	410	1,373
CASS	11,980	40.42	24,696	191,262
CEDAR	3,220	36.86	6,053	15,282
CHARITON	29,770	45.91	69,704	425,877
CHRISTIAN	560	37.26	1,064	2,829
CLARK	9,540	40.34	19,627	233,812
CLAY	6,930	38.81	13,717	72,985

COUNTIES	Wheat			Total Residues
	Acres Harvested*	Yield Per Acre (bu)*	Tons of Residue	
CLINTON	6,970	40.63	14,443	144,012
COLE	3,980	38.45	7,805	37,646
COOPER	26,690	42.57	57,946	248,335
CRAWFORD	560	31.62	903	5,179
DADE	20,110	38.29	39,271	80,987
DALLAS	625	35.75	1,140	7,149
DAVIESS	13,960	41.16	29,304	235,084
DE KALB	8,660	38.03	16,796	144,118
DENT	608	35.45	1,100	4,195
DOUGLAS	525	29.55	791	1,665
DUNKLIN	39,630	36.35	73,468	290,119
FRANKLIN	11,850	38.66	23,364	103,671
GASCONADE	3,820	35.90	6,994	39,872
GENTRY	9,820	37.92	18,991	184,627
GREENE	1,770	39.34	3,551	7,679
GRUNDY	9,915	42.00	21,238	177,994
HARRISON	8,660	39.45	17,423	225,658
HENRY	14,790	42.05	31,718	169,650
HICKORY	1,433	32.50	2,376	7,444
HOLT	6,380	39.85	12,966	414,831
HOWARD	16,320	39.72	33,060	167,453
HOWELL	820	34.46	1,441	2,639
IRON	175	31.50	281	950
JACKSON	12,680	40.75	26,352	120,527

COUNTIES	Wheat		Tons of Residue	Total Residues
	Acres Harvested*	Yield Per Acre (bu)*		
JASPER	30,810	37.58	59,050	129,817
JEFFERSON	2,920	36.56	5,445	24,335
JOHNSON	12,690	39.99	25,881	202,493
KNOX	13,840	44.61	31,488	203,830
LACLEDE	769	34.23	1,342	5,714
LAFAYETTE	23,870	46.62	56,754	449,760
LAWRENCE	9,010	36.66	16,846	33,485
LEWIS	16,180	43.44	35,846	236,996
LINCOLN	25,660	43.57	57,018	247,996
LINN	12,970	42.61	28,185	185,662
LIVINGSTON	18,680	42.43	40,422	238,247
MCDONALD	620	33.64	1,064	1,731
MACON	14,390	40.42	29,664	201,382
MADISON	500	30.75	784	4,368
MARIES	1,630	34.52	2,870	10,936
MARION	20,700	44.93	47,433	235,982
MERCER	3,260	37.30	6,201	101,485
MILLER	1,365	35.73	2,487	15,266
MISSISSIPPI	39,070	43.36	86,398	569,728
MONITEAU	9,830	40.02	20,063	78,401
MONROE	25,730	43.43	56,990	271,487
MONTGOMERY	24,650	42.91	53,944	219,786
MORGAN	4,530	39.33	9,086	42,186
NEW MADRID	45,860	41.97	98,162	676,762

COUNTIES	Wheat			Total Residues
	Acres Harvested*	Yield Per Acre (bu)*	Tons of Residue	
NEWTON	7,660	35.26	13,775	24,057
NODAWAY	8,350	37.95	16,161	501,298
OREGON	1,725	34.83	3,064	3,357
OSAGE	3,250	36.98	6,129	45,193
OZARK	200	31.50	321	651
PEMISCOT	49,920	39.91	101,608	444,986
PERRY	19,500	40.75	40,526	164,352
PETTIS	25,650	40.78	53,346	274,778
PHELPS	760	32.62	1,264	6,448
PIKE	24,920	45.80	58,208	285,289
PLATTE	15,480	36.70	28,974	183,425
POLK	1,840	37.81	3,548	10,285
PULASKI	650	31.50	1,044	3,764
PUTNAM	1,215	39.56	2,451	67,146
RALLS	23,500	44.62	53,477	238,066
RANDOLPH	14,860	42.01	31,838	131,706
RAY	21,900	41.17	45,983	255,525
REYNOLDS	575	31.45	922	2,437
RIPLEY	2,770	36.52	5,159	30,332
ST CHARLES	20,310	43.82	45,389	274,741
ST CLAIR	14,870	39.41	29,887	91,558
ST GENEVIEVE	7,260	40.71	15,073	71,420
ST FRANCOIS	1,239	38.49	2,432	11,704
ST LOUIS	6,270	41.48	13,264	45,033

COUNTIES	Wheat			Total Residues
	Acres Harvested*	Yield Per Acre (bu)*	Tons of Residue	
SALINE	26,310	44.70	59,979	588,635
SCHUYLER	2,065	40.44	4,259	56,965
SCOTLAND	7,170	39.62	14,488	172,329
SCOTT	39,710	39.88	80,765	418,115
SHANNON	300	30.50	467	1,030
SHELBY	20,690	46.33	48,887	277,487
STODDARD	57,040	43.77	127,329	775,422
STONE	100	33.50	171	641
SULLIVAN	3,235	39.32	6,487	83,029
TANEY	275	33.20	466	1,142
TEXAS	1,093	32.70	1,823	4,494
VERNON	39,470	38.16	76,815	266,550
WARREN	10,720	39.58	21,639	113,885
WASHINGTON	225	34.10	391	1,903
WAYNE	1,645	35.55	2,982	16,508
WEBSTER	667	32.66	1,111	2,653
WORTH	1,910	34.81	3,391	72,747
WRIGHT	481	31.78	780	1,787
STATE TOTAL	1,404,000	41.80	2,956,787	17,790,790

* Averages based on 1984-92 and 94

Table 2 -- Potential production of switchgrass or hybrid poplars on CRP Land in Missouri, annually.

County		Quantity at varying yields		
		5	7	10
	Acres	Dry tons per year		
ADAIR	21,197	105,985	148,379	211,970
ANDREW	17,835	89,175	124,845	178,350
ATCHISON	7,677	38,385	53,739	76,770
AUDRAIN	16,831	84,155	117,817	168,310
BARRY	2,255	11,275	15,785	22,550
BARTON	35,053	175,265	245,371	350,530
BATES	33,808	169,040	236,656	338,080
BENTON	6,687	33,435	46,809	66,870
BOLLINGER	3,058	15,290	21,406	30,580
BOONE	15,242	76,210	106,694	152,420
BUCHANAN	7,417	37,085	51,919	74,170
BUTLER	1,376	6,880	9,632	13,760
CALDWELL	22,818	114,090	159,726	228,180
CALLAWAY	17,129	85,645	119,903	171,290
CAMDEN				
CAPE GIRARD	8,492	42,460	59,444	84,920
CARROLL	37,208	186,040	260,456	372,080
CARTER				
CASS	17,556	87,780	122,892	175,560
CEDAR	6,202	31,010	43,414	62,020
CHARITON	30,229	151,145	211,603	302,290
CHRISTIAN	121	605	847	1,210
CLARK	25,276	126,380	176,932	252,760
CLAY	2,538	12,690	17,766	25,380
CLINTON	17,305	86,525	121,135	173,050
COLE	420	2,100	2,940	4,200
COOPER	15,509	77,545	108,563	155,090
CRAWFORD	131	655	917	1,310
DADE	12,153	60,765	85,071	121,530
DALLAS	1,363	6,815	9,541	13,630
DAVIESS	43,311	216,555	303,177	433,110
DE KALB	37,596	187,980	263,172	375,960
DENT	857	4,285	5,999	8,570
DOUGLAS	213	1,065	1,491	2,130
DUNKLIN	1,470	7,350	10,290	14,700
FRANKLIN	4,823	24,115	33,761	48,230
GASCONADE	882	4,410	6,174	8,820
GENTRY	42,561	212,805	297,927	425,610
GREENE	76	380	532	760
GRUNDY	38,017	190,085	266,119	380,170

County		Quantity at varying yields		
		5	7	10
	Acres	Dry tons per year		
HARRISON	65,569	327,845	458,983	655,690
HENRY	19,272	96,360	134,904	192,720
HICKORY	1,553	7,765	10,871	15,530
HOLT	5,872	29,360	41,104	58,720
HOWARD	15,179	75,895	106,253	151,790
HOWELL				
IRON	127	635	889	1,270
JACKSON	1,204	6,020	8,428	12,040
JASPER	23,424	117,120	163,968	234,240
JEFFERSON	312	1,560	2,184	3,120
JOHNSON	24,125	120,625	168,875	241,250
KNOX	35,672	178,360	249,704	356,720
LACLEDE	583	2,915	4,081	5,830
LAFAYETTE	7,706	38,530	53,942	77,060
LAWRENCE	8,288	41,440	58,016	82,880
LEWIS	30,590	152,950	214,130	305,900
LINCOLN	8,268	41,340	57,876	82,680
LINN	49,123	245,615	343,861	491,230
LIVINGSTON	25,891	129,455	181,237	258,910
MCDONALD	43	215	301	430
MACON	38,798	193,990	271,586	387,980
MADISON	452	2,260	3,164	4,520
MARIES	462	2,310	3,234	4,620
MARION	15,498	77,490	108,486	154,980
MERCER	37,053	185,265	259,371	370,530
MILLER	94	470	658	940
MISSISSIPPI	282	1,410	1,974	2,820
MONITEAU	9,782	48,910	68,474	97,820
MONROE	26,870	134,350	188,090	268,700
MONTGOMERY	12,492	62,460	87,444	124,920
MORGAN	3,270	16,350	22,890	32,700
NEW MADRID				
NEWTON	7,611	38,055	53,277	76,110
NODAWAY	27,119	135,595	189,833	271,190
OREGON				
OSAGE	339	1,695	2,373	3,390
OZARK				
PEMISCOT				
PERRY	6,727	33,635	47,089	67,270
PETTIS	19,206	96,030	134,442	192,060
PHELPS	679	3,395	4,753	6,790

County		Quantity at varying yields		
		5	7	10
	Acres	Dry tons per year		
PIKE	8,966	44,830	62,762	89,660
PLATTE	7,511	37,555	52,577	75,110
POLK	1,166	5,830	8,162	11,660
PULASKI				
PUTNAM	23,816	119,080	166,712	238,160
RALLS	13,333	66,665	93,331	133,330
RANDOLPH	27,813	139,065	194,691	278,130
RAY	22,003	110,015	154,021	220,030
REYNOLDS	47	235	329	470
RIPLEY	1,480	7,400	10,360	14,800
ST CHARLES	1,309	6,545	9,163	13,090
ST CLAIR	11,821	59,105	82,747	118,210
ST GENEVIEVE				
ST FRANCOIS	268	1,340	1,876	2,680
ST LOUIS	4,175	20,875	29,225	41,750
SALINE	9,347	46,735	65,429	93,470
SCHUYLER	20,153	100,765	141,071	201,530
SCOTLAND	37,063	185,315	259,441	370,630
SCOTT	4,147	20,735	29,029	41,470
SHANNON	34	170	238	340
SHELBY	13,082	65,410	91,574	130,820
STODDARD	16,700	83,500	116,900	167,000
STONE	21	105	147	210
SULLIVAN	44,536	222,680	311,752	445,360
TANEY				
TEXAS	865	4,325	6,055	8,650
VERNON	50,126	250,630	350,882	501,260
WARREN	4,219	21,095	29,533	42,190
WASHINGTON	69	345	483	690
WAYNE	629	3,145	4,403	6,290
WEBSTER				
WORTH	17,849	89,245	124,943	178,490
WRIGHT				
Total	1,424,775	7,123,875	9,973,425	14,035,780

Note: CRP acres in Missouri by county for Signups 1-12 less early out, less those that expired (1995).

Table 3 -- Wood residues from logging and primary wood processing, Missouri, 1994.

COUNTIES	Logging residues	Primary wood processing residues							
		Total		Coarse 1/		Fine 2/		Bark	
		Soft	Hard	Soft	Hard	Soft	Hard	Soft	Hard
	1,000 cu ft	1,000 tons							
ADAIR	383								
ANDREW	113								
ATCHISON	280								
AUDRAIN	445								
BARRY	921	0.94	0	0	0	0.94	0	0	0
BARTON	406	0	14.64	0	7.03	0	7.61	0	2.86
BATES	347								
BENTON	53								
BOLLINGER	2,181	0	3.48	0	0.47	0	3.01	0	0.68
BOONE	202								
BUCHANAN	25								
BUTLER	1,140	1.14	5.23	0.72	1.05	0.42	4.18	0.31	2.49
CALDWELL	178								
CALLAWAY	447								
CAMDEN	600	0	0.13	0	0	0	0.13	0	0
CAPE GIRARDE	1,129								
CARROLL	187								
CARTER	2,327	3.59	12.98	0.06	1.49	3.53	11.49	0.1	0.79
CASS	58								
CEDAR	388								
CHARITON	474								
CHRISTIAN	430	0.02	0.95	0	0	0.02	0.95	0	0.09
CLARK	526	0	6.37	0	3.8	0	2.57	0	1.59
CLAY	5								
CLINTON	24								
COLE	347								
COOPER	279	0	0.06	0	0	0	0.06	0	0.15
CRAWFORD	2,524	1	8.38	0	0	1	8.38	0	0
DADE	499								
DALLAS	124	0.04	0.18	0.02	0	0.02	0.18	0.01	0
DAVISS	312								
DE KALB	22								
DENT	2,311	0.11	5.85	0	0	0.11	5.85	0	0
DOUGLAS	1,866	0.56	1.21	0.35	0	0.21	1.21	0.15	0.85
DUNKLIN	78		0						
FRANKLIN	886	0	0	0	0	0	0	0	0
GASCONADE	722		0.58	0	0	0	0.58	0	0
GENTRY	232								
GREENE	233								

COUNTIES	Logging residues	Primary wood processing residues							
		Total		Coarse 1/		Fine 2/		Bark	
		Soft	Hard	Soft	Hard	Soft	Hard	Soft	Hard
	1,000 cu ft	1,000 tons							
GRUNDY	301								
HARRISON	184								
HENRY	209								
HICKORY	89								
HOLT	139								
HOWARD	500								
HOWELL	2,336	1.82	5.42	0.94	0.94	0.88	4.48	0.4	0.4
IRON	2,114	0.44	5.7	0.01	0.25	0.43	5.45	0.07	0.11
JACKSON	4								
JASPER	431								
JEFFERSON	99								
JOHNSON	47								
KNOX	412		0.93	0	0.21	0	0.72	0	0.09
LACLEDE	810		0.86	0	0	0	0.86	0	0
LAFAYETTE	17								
LAWRENCE	350								
LEWIS	257								
LINCOLN	435		4.34	0	0.65	0	3.69	0	4.47
LINN	348								
LIVINGSTON	647								
MCDONALD	1,128	0	2.03	0	1.22	0	0.8	0	0.52
MACON	682		4.64	0	1.78	0	2.86	0	0.99
MADISON	1,981	0.79	3.86	0.16	0.51	0.63	3.36	0.07	0.21
MARIES	768		0.02	0	0.01	0	0.01	0	0.01
MARION	438		4.84	0	3.53	0	1.31	0	1.43
MERCER	88								
MILLER	103	1.98	0.34	1.98	0	0	0.34	0.5	0
MISSISSIPPI	84								
MONITEAU	112								
MONROE	448								
MONTGOMERY	479								
MORGAN	301								
NEW MADRID	181								
NEWTON	1,456		5.5	0	4.11	0	1.38	0	1.65
NODAWAY	105								
OREGON	3,552	0.09	17.6	0	3.95	0.09	13.65	0	1.65
OSAGE	508	0	0.46	0	0.28	0	0.18	0	0
OZARK	1,181	0.23	3.05	0.14	0	0.08	3.05	0.06	0
PEMISCOT									

COUNTIES	Logging residues	Primary wood processing residues							
		Total		Coarse 1/		Fine 2/		Bark	
		Soft	Hard	Soft	Hard	Soft	Hard	Soft	Hard
	1,000 cu ft	1,000 tons							
PERRY	807	0	2.02	0	0	0	2.02	0	18.98
PETTIS	98		0						
PHELPS	993	0	5.81	0	0	0	5.81	0	0
PIKE	836	0	6.8	0	1.96	0	4.84	0	0.01
PLATTE	4								
POLK	310	0.05	0	0	0	0.05	0	0	0
PULASKI	1,176								
PUTNAM	177								
RALLS	518	0	1.37	0	0.71	0	0.66	0	0.29
RANDOLPH	587	0	0.01	0	0	0	0.01	0	0
RAY	65								
REYNOLDS	7,524	0.38	8.69	0	0.16	0.38	8.53	0	0.28
RIPLEY	2,736	1.89	15.38	0.05	2.25	1.84	13.13	0.02	1.17
ST CHARLES	1,512								
ST CLAIR	94								
ST GENEVIEVE	374	0.89	0.02	0.68	0	0.2	0.02	0.17	0.01
ST FRANCOIS	270	0.16	1.39	0.1	0.36	0.06	1.03	0.03	0.07
ST LOUIS	135								
SALINE	119								
SCHUYLER	69								
SCOTLAND	289	0	2.05	0	1.21	0	0.84	0	0.52
SCOTT	261								
SHANNON	5,441	2.77	18.64	0	0	2.77	18.64	0.31	1.32
SHELBY	201								
STODDARD	448	0	2.98	0	0.2	0	2.78	0	0.09
STONE	348								
SULLIVAN	327	0	0.1	0	0.1	0	0	0	0.04
TANEY	560	0	0.2	0	0	0	0.2	0	0
TEXAS	2,217	1.37	4.19	0	0	1.37	4.19	0.9	0.3
VERNON	263								
WARREN	683								
WASHINGTON	3,179	0.67	1.1	0.38	0.23	0.29	0.88	0.21	0.64
WAYNE	3,489	3.32	7.92	0.17	0.83	3.15	7.09	0.07	0.41
WEBSTER	665	0	2.28	0	0	0	2.28	0	0
WORTH	116								
WRIGHT	1,706	0	1.33	0	0	0	1.33	0	0
STATE TOTAL	85,625	24.25	201.9	5.76	39.29	18.47	162.6	3.38	45.16

Table 4 -- Municipal solid waste by counties in Missouri, April 1, 1996 - March 31, 1997.

County	Total	Paper	Glass	Metal	Plastics	Organics	Inorganics
	Percent of Total						
		36.73	6.03	6.94	14.29	30.89	5.16
	Tons						
Adair	13,277	4,877	801	921	1,897	4,101	685
Andrew	0						
Atchison	0						
Audrain	6,207	2,280	374	431	887	1,917	320
Barry	0						
Barton	162,072	59,529	9,773	11,248	23,160	50,064	8,363
Bates	0						
Benton	0						
Bollinger	0						
Boone	126,394	46,425	7,622	8,772	18,062	39,043	6,522
Buchanan	102,978	37,824	6,210	7,147	14,716	31,810	5,314
Butler	104,729	38,467	6,315	7,268	14,966	32,351	5,404
Caldwell	0						
Callaway	10,145	3,726	612	704	1,450	3,134	523
Camden	5,038	1,850	304	350	720	1,556	260
Cape Girardeau	0						
Carroll	0						
Carter	0						
Cass	0						
Cedar	0						
Chariton	0						
Christian	0						
Clark	0						
Clay	0						
Clinton	0						
Cole	120,939	44,421	7,293	8,393	17,282	37,358	6,240

County	Total	Paper	Glass	Metal	Plastics	Organics	Inorganics
	Percent of Total						
		36.73	6.03	6.94	14.29	30.89	5.16
	Tons						
Cooper	0						
Crawford	0						
Dade	0						
Dallas	0						
Daviess	0						
De Kalb	0						
Dent	0						
Douglas	0						
Dunklin	0						
Franklin	0						
Gasconade	0						
Gentry	0						
Greene	97,230	35,713	5,863	6,748	13,894	30,034	5,017
Grundy	8,702	3,196	525	604	1,244	2,688	449
Harrison	0						
Henry	57,418	21,090	3,462	3,985	8,205	17,736	2,963
Hickory	0						
Holt	0						
Howard	0						
Howell	0						
Iron	0						
Jackson	576,826	211,868	34,783	40,032	82,428	178,182	29,764
Jasper	27,152	9,973	1,637	1,884	3,880	8,387	1,401
Jefferson	31,408	11,536	1,894	2,180	4,488	9,702	1,621
Johnson	65,081	23,904	3,924	4,517	9,300	20,104	3,358
Knox	0						

County	Total	Paper	Glass	Metal	Plastics	Organics	Inorganics
	Percent of Total						
		36.73	6.03	6.94	14.29	30.89	5.16
	Tons						
Laclede	0						
Lafayette	0						
Lawrence	73,404	26,961	4,426	5,094	10,489	22,674	3,788
Lewis	90,009	33,060	5,428	6,247	12,862	27,804	4,644
Lincoln	0						
Linn	0						
Livingston	32,983	12,115	1,989	2,289	4,713	10,188	1,702
McDonald	0						
Macon	53,206	19,543	3,208	3,692	7,603	16,435	2,745
Madison	0						
Maries	0						
Marion	0						
Mercer	0						
Miller	0						
Mississippi	0						
Moniteau	0						
Monroe	0						
Montgomery	0						
Morgan	0						
New Madrid	0						
Newton	10,858	3,988	655	754	1,552	3,354	560
Nodaway	13,873	5,096	837	963	1,982	4,285	716
Oregon	0						
Osage	0						
Ozark	0						
Pemiscot	0						

County	Total	Paper	Glass	Metal	Plastics	Organics	Inorganics
	Percent of Total						
		36.73	6.03	6.94	14.29	30.89	5.16
	Tons						
Perry	10,378	3,812	626	720	1,483	3,206	536
Pettis	77,647	28,520	4,682	5,389	11,096	23,985	4,007
Phelps	0						
Pike	11,422	4,195	689	793	1,632	3,528	589
Platte	0						
Polk	0						
Pulaski	0						
Putnam	0						
Ralls	0						
Randolph	13,556	4,979	817	941	1,937	4,187	699
Ray	0						
Reynolds	0						
Ripley	0						
St. Charles	63,229	23,224	3,813	4,388	9,035	19,531	3,263
St. Clair	0						
Ste. Genevieve	51,289	18,838	3,093	3,559	7,329	15,843	2,647
St. Francois	0						
St. Louis	1,643,410	603,624	99,098	114,053	234,843	507,649	84,800
Saline	0						
Schuyler	0						
Scotland	0						
Scott	0						
Shannon	0						
Shelby	0						
Stoddard	169,003	62,075	10,191	11,729	24,151	52,205	8,721
Stone	47,449	17,428	2,861	3,293	6,780	14,657	2,448
Sullivan	0						
Taney	0						

County	Total	Paper	Glass	Metal	Plastics	Organics	Inorganics
	Percent of Total						
		36.73	6.03	6.94	14.29	30.89	5.16
	Tons						
Texas	0						
Vernon	0						
Warren	0						
Washington	31,324	11,505	1,889	2,174	4,476	9,676	1,616
Wayne	0						
Webster	0						
Worth	0						
Wright	243,042	89,269	14,655	16,867	34,731	75,076	12,541
St. Louis City	194,058	71,278	11,702	13,468	27,731	59,945	10,013
Totals	4,345,736	1,596,189	262,048	301,594	621,006	1,342,398	224,240

Note: Tonnage of waste is reported by landfills and transfer stations. So this table reflects the amount of waste that flows through, or is landfilled in various counties. It does not represent the amount of waste generated in any one county.

Survey location		Paper	Glass	Metal	Plastic	Organic	Inorganic
		Percent by weight					
Springfield		39.6	5.3	7.4	14.5	28.3	5.1
Reeds Spring		40.5	7.0	7.3	17.3	21.6	6.4
Pemiscot Co.		37.6	7.0	6.9	13.9	29.9	4.5
St. Francois Co.		34.9	6.5	7.9	14.1	31.6	5.1
St. Louis		36.6	7.4	6.3	12.4	31.5	6.1
Macon		37.3	5.2	6.9	15.1	32.4	3.1
Maryville		28.5	3.9	5.1	14.0	40.9	7.5
Lee's Summit		41.4	5.9	6.3	12.5	28.8	5.2
Clinton		35.8	7.2	8.2	13.6	30.9	4.3
Lamar		35.1	4.9	7.1	15.5	33.0	4.3
Totals		367.3	60.3	69.4	142.9	308.9	51.6
Averages		36.7	6.0	6.9	14.3	30.9	5.2

Note: the above information was taken from: "The Missouri Waste Composition Study: Executive Summary Prepared for the Missouri Department of Natural Resources by the Midwest Assistance program, Inc, 1996.

Table 5 -- Estimated tire resources in Missouri

Counties	Numbers of tires		
	In unpermitted dumps	In permitted dumps	Generated annually
ADAIR	6,300		24,577
ANDREW			14,632
ATCHISON			7,457
AUDRAIN			23,599
BARRY	39,244		27,547
BARTON			11,312
BATES	12,000		15,025
BENTON			13,859
BOLLINGER	136,000		10,619
BOONE	25,000		112,379
BUCHANAN			83,083
BUTLER	1,000		38,765
CALDWELL			8,380
CALLAWAY		900,000	32,809
CAMDEN	7,000		27,495
CAPE GIRARDEAU	3,000		61,633
CARROLL			10,748
CARTER			5,515
CASS	1,013,800		63,808
CEDAR			12,093
CHARITON			9,202
CHRISTIAN	21,000		32,644
CLARK			7,547
CLAY	2,000		153,411
CLINTON	55,500		16,595
COLE		0	63,579
COOPER			14,835
CRAWFORD	19,000		19,173
DADE	900		7,449
DALLAS	700		12,646
DAVIESS			7,865
DE KALB			9,967
DENT			13,702
DOUGLAS			11,876
DUNKLIN	540,000		33,112
FRANKLIN	4,800		80,603
GASCONADE			14,006
GENTRY			6,848
GREENE	10,000		207,949
GRUNDY			10,536

Counties	Numbers of tires		
	In unpermitted dumps	In permitted dumps	Generated annually
HARRISON			8,469
HENRY	40,000		20,044
HICKORY			7,335
HOLT			6,034
HOWARD	800		9,631
HOWELL	65,000		31,447
IRON	400		10,726
JACKSON	120,700		633,232
JASPER	78,000		90,465
JEFFERSON	248,500		171,380
JOHNSON	255,900	46,000	42,514
KNOX			4,482
LACLEDE	400,000		27,158
LAFAYETTE			31,107
LAWRENCE	1,000		30,236
LEWIS	1,250		10,233
LINCOLN			28,892
LINN			13,885
LIVINGSTON	200		14,592
MCDONALD	70,000		16,938
MACON	300	35,000	15,345
MADISON	8,000		11,127
MARIES			7,976
MARION			27,682
MERCER			3,723
MILLER			20,700
MISSISSIPPI	8,000		14,442
MONITEAU	1,450		12,298
MONROE	200		9,104
MONTGOMERY	1,400		11,355
MORGAN	31,750		15,574
NEW MADRID			20,928
NEWTON	43,523	621,000	44,445
NODAWAY	4,500		21,709
OREGON			9,470
OSAGE			12,018
OZARK			8,598
PEMISCOT	2,500		21,921
PERRY			16,648
PETTIS	14,000		35,437

Counties	Numbers of tires		
	In unpermitted dumps	In permitted dumps	Generated annually
PHELPS			35,248
PIKE	3,550		15,969
PLATTE			57,867
POLK	515,000		21,826
PULASKI	300		41,307
PUTNAM			5,079
RALLS	6,700		8,476
RANDOLPH	6,750		24,370
RAY			21,971
REYNOLDS	1,500		6,661
RIPLEY	32,700		12,303
ST CHARLES	3,000		212,907
ST CLAIR			8,457
ST GENEVIEVE			16,037
ST FRANCOIS	331,700		48,904
ST LOUIS	55,500		993,529
SALINE			23,523
SCHUYLER			4,236
SCOTLAND			4,822
SCOTT	210,800		39,376
SHANNON			7,613
SHELBY			6,942
STODDARD			28,895
STONE			10,978
SULLIVAN			6,326
TANEY			25,561
TEXAS			21,476
VERNON	20,100		19,041
WARREN	3,000		19,534
WASHINGTON	29,500		20,380
WAYNE	70,500		11,543
WEBSTER	54,500		23,753
WORTH			2,440
WRIGHT			16,758
St. Louis City			396,685
STATE TOTAL	4,639,717	1,602,000	4,712,288

Note: the 43,523 tires in the Newton County unpermitted category are actually considered illegal.

Table 6 -- Estimated volumes of biomass, municipal solid waste, and other potential energy resources in Missouri, various dates.

Counties	Crop residues	Switchgrass on CRP @ 5 tons/A	Wood harvesting residues	Primary wood processing residues							
				Totals		Course		Fine		Bark	
				Softwood	Hardwood	Soft	Hard	Soft	Hard	Soft	Hard
	Tons	Tons	1,000 cu ft	1,000 tons of green weight							
ADAIR	101,183	105,985	383								
ANDREW	220,968	89,175	113								
ATCHISON	535,181	38,385	280								
AUDRAIN	499,658	84,155	445								
BARRY	8,948	11,275	921	0.94	0.00	0.00	0.00	0.94	0.00	0.00	0.00
BARTON	268,311	175,265	406	0.00	14.64	0.00	7.03	0.00	7.61	0.00	2.86
BATES	272,837	169,040	347								
BENTON	60,516	33,435	53								
BOLLINGER	73,491	15,290	2,181	0.00	3.48	0.00	0.47	0.00	3.01	0.00	0.68
BOONE	138,120	76,210	202								
BUCHANAN	214,590	37,085	25								
BUTLER	238,346	6,880	1,140	1.14	5.23	0.72	1.05	0.42	4.18	0.31	2.49
CALDWELL	150,376	114,090	178								
CALLAWAY	180,499	85,645	447								
CAMDEN	2,140		600	0.00	0.13	0.00	0.00	0.00	0.13	0.00	0.00
CAPE GIRARDEAU	209,351	42,460	1,129								
CARROLL	440,661	186,040	187								
CARTER	1,373		2,327	3.59	12.98	0.06	1.49	3.53	11.49	0.10	0.79
CASS	191,262	87,780	58								
CEDAR	15,282	31,010	388								
CHARITON	425,877	151,145	474								
CHRISTIAN	2,829	605	430	0.02	0.95	0.00	0.00	0.02	0.95	0.00	0.09
CLARK	233,812	126,380	526	0.00	6.37	0.00	3.80	0.00	2.57	0.00	1.59
CLAY	72,985	12,690	5								
CLINTON	144,012	86,525	24								
COLE	37,646	2,100	347								
COOPER	248,335	77,545	279	0.00	0.06	0.00	0.00	0.00	0.06	0.00	0.15

Counties	Crop residues	Switchgrass on CRP @ 5 tons/A	Wood harvesting residues	Primary wood processing residues							
				Totals		Course		Fine		Bark	
				Softwood	Hardwood	Soft	Hard	Soft	Hard	Soft	Hard
	Tons	Tons	1,000 cu ft	1,000 tons of green weight							
CRAWFORD	5,179	655	2,524	1.00	8.38	0.00	0.00	1.00	8.38	0.00	0.00
DADE	80,987	60,765	499								
DALLAS	7,149	6,815	124	0.04	0.18	0.02	0.00	0.02	0.18	0.01	0.00
DAVISS	235,084	216,555	312								
DE KALB	144,118	187,980	22								
DENT	4,195	4,285	2,311	0.11	5.85	0.00	0.00	0.11	5.85	0.00	0.00
DOUGLAS	1,665	1,065	1,866	0.56	1.21	0.35	0.00	0.21	1.21	0.15	0.85
DUNKLIN	190,119	7,350	78		0.00						
FRANKLIN	103,671	24,115	886	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GASCONADE	39,872	4,410	722		0.58	0.00	0.00	0.00	0.58	0.00	0.00
GENTRY	184,627	212,805	232								
GREENE	7,679	380	233								
GRUNDY	177,994	190,085	301								
HARRISON	255,658	327,845	184								
HENRY	169,650	96,360	209								
HICKORY	7,444	7,765	89								
HOLT	414,831	29,360	139								
HOWARD	167,453	75,895	500								
HOWELL	2,639		2,336	1.82	5.42	0.94	0.94	0.88	4.48	0.40	0.40
IRON	950	635	2,114	0.44	5.70	0.01	0.25	0.43	5.45	0.07	0.11
JACKSON	120,527	6,020	4								
JASPER	129,817	117,120	431								
JEFFERSON	24,335	1,560	99								
JOHNSON	202,493	120,625	47								
KNOX	203,830	178,360	412		0.93	0.00	0.21	0.00	0.72	0.00	0.09
LACLEDE	5,714	2,915	810		0.86	0.00	0.00	0.00	0.86	0.00	0.00
LAFAYETTE	449,760	38,530	17								
LAWRENCE	33,485	41,440	350								
LEWIS	236,996	152,950	257								
LINCOLN	247,996	41,340	435		4.34	0.00	0.65	0.00	3.69	0.00	4.47

Counties	Crop residues	Switchgrass on CRP @ 5 tons/A	Wood harvesting residues	Primary wood processing residues							
				Totals		Course		Fine		Bark	
				Softwood	Hardwood	Soft	Hard	Soft	Hard	Soft	Hard
	Tons	Tons	1,000 cu ft	1,000 tons of green weight							
LINN	185,662	245,615	348								
LIVINGSTON	238,247	129,455	647								
MCDONALD	1,731	215	1,128	0.00	2.03	0.00	1.22	0.00	0.80	0.00	0.52
MACON	201,382	193,990	682		4.64	0.00	1.78	0.00	2.86	0.00	0.99
MADISON	4,368	2,260	1,981	0.79	3.86	0.16	0.51	0.63	3.36	0.07	0.21
MARIES	10,936	2,310	768		0.02	0.00	0.01	0.00	0.01	0.00	0.01
MARION	235,982	77,490	438		4.84	0.00	3.53	0.00	1.31	0.00	1.43
MERCER	101,485	185,265	88								
MILLER	15,266	470	103	1.98	0.34	1.98	0.00	0.00	0.34	0.50	0.00
MISSISSIPPI	569,728	1,410	84								
MONITEAU	78,401	48,910	112								
MONROE	271,487	134,350	448								
MONTGOMERY	219,786	62,460	479								
MORGAN	42,186	16,350	301								
NEW MADRID	676,762		181								
NEWTON	24,057	38,055	1,456		5.50	0.00	4.11	0.00	1.38	0.00	1.65
NODAWAY	501,298	135,595	105								
OREGON	3,357		3,552	0.09	17.60	0.00	3.95	0.09	13.65	0.00	1.65
OSAGE	45,193	1,695	508	0.00	0.46	0.00	0.28	0.00	0.18	0.00	0.00
OZARK	651		1,181	0.23	3.05	0.14	0.00	0.08	3.05	0.06	0.00
PEMISCOT	444,986										
PERRY	164,352	33,635	807	0.00	2.02	0.00	0.00	0.00	2.02	0.00	18.98
PETTIS	274,778	96,030	98		0.00						
PHELPS	6,488	3,395	993	0.00	5.81	0.00	0.00	0.00	5.81	0.00	0.00
PIKE	285,289	44,830	836	0.00	6.80	0.00	1.96	0.00	4.84	0.00	0.01
PLATTE	183,425	37,555	4								
POLK	10,285	5,830	310	0.05	0.00	0.00	0.00	0.05	0.00	0.00	0.00
PULASKI	3,764		1,176								
PUTNAM	67,146	119,080	177								
RALLS	238,066	66,665	518	0.00	1.37	0.00	0.71	0.00	0.66	0.00	0.29

Counties	Crop residues	Switchgrass on CRP @ 5 tons/A	Wood harvesting residues	Primary wood processing residues							
				Totals		Course		Fine		Bark	
				Softwood	Hardwood	Soft	Hard	Soft	Hard	Soft	Hard
	Tons	Tons	1,000 cu ft	1,000 tons of green weight							
RANDOLPH	131,706	139,065	587	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00
RAY	255,525	110,015	65								
REYNOLDS	2,437	235	7,524	0.38	8.69	0.00	0.16	0.38	8.53	0.00	0.28
RIPLEY	30,332	7,400	2,736	1.89	15.38	0.05	2.25	1.84	13.13	0.02	1.17
ST CHARLES	274,741	6,545	1,512								
ST CLAIR	91,558	59,105	94								
ST GENEVIEVE	71,420		374	0.89	0.02	0.68	0.00	0.20	0.02	0.17	0.01
ST FRANCOIS	11,704	1,340	270	0.16	1.39	0.10	0.36	0.06	1.03	0.03	0.07
ST LOUIS	45,033	20,875	135								
SALINE	588,635	46,735	119								
SCHUYLER	56,956	100,765	69								
SCOTLAND	172,329	185,315	289	0.00	2.05	0.00	1.21	0.00	0.84	0.00	0.52
SCOTT	418,115	20,735	261								
SHANNON	1,030	170	5,441	2.77	18.64	0.00	0.00	2.77	18.64	0.31	1.32
SHELBY	277,487	65,410	201								
STODDARD	775,422	83,500	448	0.00	2.98	0.00	0.20	0.00	2.78	0.00	0.09
STONE	641	105	348								
SULLIVAN	83,029	222,680	327	0.00	0.10	0.00	0.10	0.00	0.00	0.00	0.04
TANEY	1,142		560	0.00	0.20	0.00	0.00	0.00	0.20	0.00	0.00
TEXAS	4,494	4,325	2,217	1.37	4.19	0.00	0.00	1.37	4.19	0.90	0.30
VERNON	266,550	250,630	263								
WARREN	113,885	21,095	683								
WASHINGTON	1,903	345	3,179	0.67	1.10	0.38	0.23	0.29	0.88	0.21	0.64
WAYNE	16,508	3,145	3,489	3.32	7.92	0.17	0.83	3.15	7.09	0.07	0.41
WEBSTER	2,653		665	0.00	2.28	0.00	0.00	0.00	2.28	0.00	0.00
WORTH	72,747	89,245	116								
WRIGHT	1,787		1,706	0.00	1.33	0.00	0.00	0.00	1.33	0.00	0.00
St Louis City											
State Total	17,790,790	7,123,875	85,625	24.25	201.91	5.76	39.29	18.47	162.62	3.38	45.16

Counties	Municipal solid waste (MSW)						Tires		
	Paper	Glass	Metal	Plastics	Organics	Inorganics	In unpermitted	In permitted	Generated
	36.73	6.03	6.94	14.29	30.89	5.16	dumps	dumps	annually
	Tons annually						Number		
LINN									13,885
LIVINGSTON	12,115	1,989	2,289	4,713	10,188	1,702	200		14,592
MCDONALD							70,000		16,938
MACON	19,543	3,208	3,692	7,603	16,435	2,745	300	35,000	15,345
MADISON							8,000		11,127
MARIES									7,976
MARION									27,682
MERCER									3,723
MILLER									20,700
MISSISSIPPI							8,000		14,442
MONITEAU							1,450		12,298
MONROE							200		9,104
MONTGOMERY							1,400		11,355
MORGAN							31,750		15,574
NEW MADRID									20,928
NEWTON	3,988	655	754	1,552	3,354	560	43,523	621,000	44,445
NODAWAY	5,096	837	963	1,982	4,285	716	4,500		21,709
OREGON									9,470
OSAGE									12,018
OZARK									8,598
PEMISCOT							2,500		21,921
PERRY	3,812	626	720	1,483	3,206	536			16,648
PETTIS	28,520	4,682	5,389	11,096	23,985	4,007	14,000		35,437
PHELPS									35,248
PIKE	4,195	689	793	1,632	3,528	589	3,550		15,969
PLATTE									57,867
POLK							515,000		21,826
PULASKI							300		41,307
PUTNAM									5,079
RALLS							6,700		8,476

Counties	Municipal solid waste (MSW)						Tires		
	Paper	Glass	Metal	Plastics	Organics	Inorganics	In unpermitted	In permitted	Generated
	Percent of total MSW weight						dumps	dumps	annually
	36.73	6.03	6.94	14.29	30.89	5.16			
	Tons annually						Number		
RANDOLPH	4,979	817	941	1,937	4,187	699	6,750		24,370
RAY									21,971
REYNOLDS							1,500		6,661
RIPLEY							32,700		12,303
ST CHARLES	23,224	3,813	4,388	9,035	19,531	3,263	3,000		212,907
ST CLAIR									8,457
ST GENEVIEVE	18,838	3,093	3,559	7,329	15,843	2,647			16,037
ST FRANCOIS							331,700		48,904
ST LOUIS	603,624	99,098	114,053	234,843	507,649	84,800	55,500		993,529
SALINE									23,523
SCHUYLER									4,236
SCOTLAND									4,822
SCOTT							210,800		39,376
SHANNON									7,613
SHELBY									6,942
STODDARD	62,075	10,191	11,729	24,151	52,205	8,721			28,895
STONE	17,428	2,861	3,293	6,780	14,657	2,448			10,978
SULLIVAN									6,326
TANEY									25,561
TEXAS									21,476
VERNON							20,100		19,041
WARREN							3,000		19,534
WASHINGTON	11,505	1,889	2,174	4,476	9,676	1,616	29,500		20,380
WAYNE							70,500		11,543
WEBSTER							54,500		23,753
WORTH									2,440
WRIGHT	89,269	14,655	16,867	34,731	75,076	12,541			16,758
St Louis City	71,278	11,702	13,468	27,731	59,945	10,013			396,685
State Total	1,596,189	262,048	301,594	621,006	1,342,398	224,240	4,639,717	1,602,000	5,108,973

Table 7 -- Estimated energy content of selected biomass, municipal solid waste, and tires in Missouri annually

County	Crop residues	Switchgrass @ 5 tons/A	Wood harvesting residues	Primary wood processing								
				Totals		Course		Fine		Bark		
				Soft	Hard	Soft	Hard	Soft	Hard	Soft	Hard	
	Million Btus annually											
ADAIR	1,315,379	1,632,169	129,607	0	0	0	0	0	0	0	0	
ANDREW	2,872,584	1,373,295	38,239	0	0	0	0	0	0	0	0	
ATCHISON	6,957,353	591,129	94,752	0	0	0	0	0	0	0	0	
AUDRAIN	6,495,554	1,295,987	150,588	0	0	0	0	0	0	0	0	
BARRY	116,324	173,635	311,666	8,836	0	0	0	8,836	0	0	0	
BARTON	3,488,043	2,699,081	137,390	0	158,644	0	63,270	0	68,490	0	26,884	
BATES	3,546,881	2,603,216	117,425	0	0	0	0	0	0	0	0	
BENTON	786,708	514,899	17,935	0	0	0	0	0	0	0	0	
BOLLINGER	955,383	235,466	738,050	0	37,712	0	4,230	0	27,090	0	6,392	
BOONE	1,795,560	1,173,634	68,357	0	0	0	0	0	0	0	0	
BUCHANAN	2,789,670	571,109	8,460	0	0	0	0	0	0	0	0	
BUTLER	3,098,498	105,952	385,776	13,754	70,476	6,768	9,450	3,948	37,620	3,038	23,406	
CALDWELL	1,954,888	1,756,986	60,235	0	0	0	0	0	0	0	0	
CALLAWAY	2,346,487	1,318,933	151,265	0	0	0	0	0	0	0	0	
CAMDEN	27,820	0	203,040	0	1,170	0	0	0	1,170	0	0	
CAPE GIRARDEAU	2,721,563	653,884	382,054	0	0	0	0	0	0	0	0	
CARROLL	5,728,593	2,865,016	63,281	0	0	0	0	0	0	0	0	
CARTER	17,849	0	787,457	34,726	124,246	564	13,410	33,182	103,410	980	7,426	
CASS	2,486,406	1,351,812	19,627	0	0	0	0	0	0	0	0	
CEDAR	198,666	477,554	131,299	0	0	0	0	0	0	0	0	
CHARITON	5,536,401	2,327,633	160,402	0	0	0	0	0	0	0	0	
CHRISTIAN	36,777	9,317	145,512	188	9,396	0	0	188	8,550	0	846	
CLARK	3,039,556	1,946,252	177,998	0	72,276	0	34,200	0	23,130	0	14,946	
CLAY	948,805	195,426	1,692	0	0	0	0	0	0	0	0	
CLINTON	1,872,156	1,332,485	8,122	0	0	0	0	0	0	0	0	
COLE	489,398	32,340	117,425	0	0	0	0	0	0	0	0	

County	Wood			Primary wood processing							
	Crop residues	Switchgrass @ 5 tons/A	harvesting residues	Totals		Course		Fine		Bark	
				Soft	Hard	Soft	Hard	Soft	Hard	Soft	Hard
	Million Btus annually										
COOPER	3,228,355	1,194,193	94,414	0	1,950	0	0	0	540	0	1,410
CRAWFORD	67,327	10,087	854,122	9,400	75,420	0	0	9,400	75,420	0	0
DADE	1,052,831	935,781	168,862	0	0	0	0	0	0	0	0
DALLAS	92,937	104,951	41,962	474	1,620	188	0	188	1,620	98	0
DAVIESS	3,056,092	3,334,947	105,581	0	0	0	0	0	0	0	0
DE KALB	1,873,534	2,894,892	7,445	0	0	0	0	0	0	0	0
DENT	54,535	65,989	782,042	1,034	52,650	0	0	1,034	52,650	0	0
DOUGLAS	21,645	16,401	631,454	6,734	18,880	3,290	0	1,974	10,890	1,470	7,990
DUNKLIN	2,471,547	113,190	26,395	0	0	0	0	0	0	0	0
FRANKLIN	1,347,723	371,371	299,822	0	0	0	0	0	0	0	0
GASCONADE	518,336	67,914	244,325	0	5,220	0	0	0	5,220	0	0
GENTRY	2,400,151	3,277,197	78,509	0	0	0	0	0	0	0	0
GREENE	99,827	5,852	78,847	0	0	0	0	0	0	0	0
GRUNDY	2,313,922	2,927,309	101,858	0	0	0	0	0	0	0	0
HARRISON	3,323,554	5,048,813	62,266	0	0	0	0	0	0	0	0
HENRY	2,205,450	1,483,944	70,726	0	0	0	0	0	0	0	0
HICKORY	96,772	119,581	30,118	0	0	0	0	0	0	0	0
HOLT	5,392,803	452,144	47,038	0	0	0	0	0	0	0	0
HOWARD	2,176,889	1,168,783	169,200	0	0	0	0	0	0	0	0
HOWELL	34,307	0	790,502	21,028	52,540	8,836	8,460	8,272	40,320	3,920	3,760
IRON	12,350	9,779	715,378	4,822	52,334	94	2,250	4,042	49,050	686	1,034
JACKSON	1,566,851	92,708	1,354	0	0	0	0	0	0	0	0
JASPER	1,687,621	1,803,648	145,850	0	0	0	0	0	0	0	0
JEFFERSON	316,355	24,024	33,502	0	0	0	0	0	0	0	0
JOHNSON	2,632,409	1,857,625	15,905	0	0	0	0	0	0	0	0
KNOX	2,649,790	2,746,744	139,421	0	9,216	0	1,890	0	6,480	0	846

[illegible]

County	Wood harvesting residues			Primary wood processing							
	Crop residues	Switchgrass @ 5 tons/A		Totals		Course		Fine		Bark	
				Soft	Hard	Soft	Hard	Soft	Hard	Soft	Hard
	Million Btus annually										
PERRY	2,136,576	517,979	273,089	0	196,592	0	0	0	18,180	0	178,412
PETTIS	3,572,114	1,478,862	33,163	0	0	0	0	0	0	0	0
PHELPS	84,344	52,283	336,031	0	52,290	0	0	0	52,290	0	0
PIKE	3,708,757	690,382	282,902	0	61,294	0	17,640	0	43,560	0	94
PLATTE	2,384,525	578,347	1,354	0	0	0	0	0	0	0	0
POLK	133,705	89,782	104,904	470	0	0	0	470	0	0	0
PULASKI	48,932	0	397,958	0	0	0	0	0	0	0	0
PUTNAM	872,898	1,833,832	59,897	0	0	0	0	0	0	0	0
RALLS	3,094,858	1,026,641	175,291	0	15,056	0	6,390	0	5,940	0	2,726
RANDOLPH	1,712,178	2,141,601	198,641	0	90	0	0	0	90	0	0
RAY	3,321,825	1,694,231	21,996	0	0	0	0	0	0	0	0
REYNOLDS	31,681	3,619	2,546,122	3,572	80,842	0	1,440	3,572	76,770	0	2,632
RIPLEY	394,316	113,960	925,862	17,962	149,418	470	20,250	17,296	118,170	196	10,998
ST CHARLES	3,571,633	100,793	511,661	0	0	0	0	0	0	0	0
ST CLAIR	1,190,254	910,217	31,810	0	0	0	0	0	0	0	0
ST GENEVIEVE	928,460	0	126,562	9,938	274	6,392	0	1,880	180	1,666	94
ST FRANCOIS	152,152	20,636	91,368	1,798	13,168	940	3,240	564	9,270	294	658
ST LOUIS	585,429	321,475	45,684	0	0	0	0	0	0	0	0
SALINE	7,652,255	719,719	40,270	0	0	0	0	0	0	0	0
SCHUYLER	740,428	1,551,781	23,350	0	0	0	0	0	0	0	0
SCOTLAND	2,240,277	2,853,851	97,798	0	23,338	0	10,890	0	7,560	0	4,888
SCOTT	5,435,495	319,319	88,322	0	0	0	0	0	0	0	0
SHANNON	13,390	2,618	1,841,234	29,076	180,168	0	0	26,038	167,760	3,038	12,408
SHELBY	3,607,331	1,007,314	68,018	0	0	0	0	0	0	0	0
STODDARD	10,080,486	1,285,900	151,603	0	27,666	0	1,800	0	25,020	0	846
STONE	8,333	1,617	117,763	0	0	0	0	0	0	0	0

County	Crop residues	Switchgrass @ 5 tons/A	Wood harvesting residues	Primary wood processing							
				Totals		Course		Fine		Bark	
				Soft	Hard	Soft	Hard	Soft	Hard	Soft	Hard
Million Btus annually											
SULLIVAN	1,079,377	3,429,272	110,657	0	1,276	0	900	0	0	0	376
TANEY	14,846	0	189,504	0	1,800	0	0	0	1,800	0	0
TEXAS	58,422	66,605	750,233	21,698	40,530	0	0	12,878	37,710	8,820	2,820
VERNON	3,465,150	3,859,702	88,999	0	0	0	0	0	0	0	0
WARREN	1,480,505	324,863	231,127	0	0	0	0	0	0	0	0
WASHINGTON	24,739	5,313	1,075,774	8,356	16,006	3,572	2,070	2,726	7,920	2,058	6,016
WAYNE	214,604	48,433	1,180,678	31,894	75,134	1,598	7,470	29,610	63,810	686	3,854
WEBSTER	34,489	0	225,036	0	20,520	0	0	0	20,520	0	0
WORTH	945,711	1,374,373	39,254	0	0	0	0	0	0	0	0
WRIGHT	23,231	0	577,310	0	11,970	0	0	0	11,970	0	0
St Louis City	0	0	0	0	0	0	0	0	0	0	0
Total	230,370,647	109,707,675	28,975,500	260,886	2,241,694	54,144	353,610	173,618	1,463,580	33,124	424,504
% of total	56.27	26.80	7.08			0.01	0.09	0.04	0.36	0.01	0.10
Million BTUs	409,377,061										

County	MSW	Tires		
		Unpermit landfills	Permit landfills	Annual disposal
	Million Btus annually			
ADAIR	108,752	1,235	0	4,817
ANDREW	0	0	0	2,868
ATCHISON	0	0	0	1,462
AUDRAIN	50,842	0	0	4,625
BARRY	0	7,692	0	5,399
BARTON	1,327,532	0	0	2,217
BATES	0	2,352	0	2,945
BENTON	0	0	0	2,716
BOLLINGER	0	26,656	0	2,081
BOONE	1,035,293	4,900	0	22,026
BUCHANAN	843,493	0	0	16,284
BUTLER	857,835	196	0	7,598
CALDWELL	0	0	0	1,642
CALLAWAY	83,098	0	176,400	6,431
CAMDEN	41,266	1,372	0	5,389
CAPE GIRARDEAU	0	588	0	12,080
CARROLL	0	0	0	2,107
CARTER	0	0	0	1,081
CASS	0	198,705	0	12,506
CEDAR	0	0	0	2,370
CHARITON	0	0	0	1,804
CHRISTIAN	0	4,116	0	6,398
CLARK	0	0	0	1,479
CLAY	0	392	0	30,069
CLINTON	0	10,878	0	3,253
COLE	990,611	0	0	12,461

County	MSW	Tires		
		Unpermit landfills	Permit landfills	Annual disposal
	Million Btus annually			
COOPER	0	0	0	2,908
CRAWFORD	0	3,724	0	3,758
DADE	0	176	0	1,460
DALLAS	0	137	0	2,479
DAVIESS	0	0	0	1,542
DE KALB	0	0	0	1,954
DENT	0	0	0	2,686
DOUGLAS	0	0	0	2,328
DUNKLIN	0	105,840	0	6,490
FRANKLIN	0	941	0	15,798
GASCONADE	0	0	0	2,745
GENTRY	0	0	0	1,342
GREENE	796,411	1,960	0	40,758
GRUNDY	71,278	0	0	2,065
HARRISON	0	0	0	1,660
HENRY	470,311	7,840	0	3,929
HICKORY	0	0	0	1,438
HOLT	0	0	0	1,183
HOWARD	0	157	0	1,888
HOWELL	0	12,740	0	6,164
IRON	0	78	0	2,102
JACKSON	4,724,782	23,657	0	124,113
JASPER	222,402	15,288	0	17,731
JEFFERSON	257,263	48,706	0	33,590
JOHNSON	533,078	50,156	9,016	8,333
KNOX	0	0	0	878

County	MSW	Tires		
		Unpermit landfills	Permit landfills	Annual disposal
	Million Btus annually			
LACLEDE	0	78,400	0	5,323
LAFAYETTE	0	0	0	6,097
LAWRENCE	601,252	196	0	5,926
LEWIS	737,264	245	0	2,006
LINCOLN	0	0	0	5,663
LINN	0	0	0	2,721
LIVINGSTON	270,164	39	0	2,860
MCDONALD	0	13,720	0	3,320
MACON	435,810	59	6,860	3,008
MADISON	0	1,568	0	2,181
MARIES	0	0	0	1,563
MARION	0	0	0	5,426
MERCER	0	0	0	730
MILLER	0	0	0	4,057
MISSISSIPPI	0	1,568	0	2,831
MONITEAU	0	284	0	2,410
MONROE	0	39	0	1,784
MONTGOMERY	0	274	0	2,226
MORGAN	0	6,223	0	3,053
NEW MADRID	0	0	0	4,102
NEWTON	88,938	8,531	121,716	8,711
NODAWAY	113,634	882	0	4,255
OREGON	0	0	0	1,856
OSAGE	0	0	0	2,356
OZARK	0	0	0	1,685
PEMISCOT	0	490	0	4,297

County	MSW	Tires		
		Unpermit landfills	Permit landfills	Annual disposal
	Million Btus annually			
PERRY	85,006	0	0	3,263
PETTIS	636,007	2,744	0	6,946
PHELPS	0	0	0	6,909
PIKE	93,558	696	0	3,130
PLATTE	0	0	0	11,342
POLK	0	100,940	0	4,278
PULASKI	0	59	0	8,096
PUTNAM	0	0	0	995
RALLS	0	1,313	0	1,661
RANDOLPH	111,037	1,323	0	4,777
RAY	0	0	0	4,306
REYNOLDS	0	294	0	1,306
RIPLEY	0	6,409	0	2,411
ST CHARLES	517,909	588	0	41,730
ST CLAIR	0	0	0	1,658
ST GENEVIEVE	420,108	0	0	3,143
ST FRANCOIS	0	65,013	0	9,585
ST LOUIS	13,461,171	10,878	0	194,732
SALINE	0	0	0	4,611
SCHUYLER	0	0	0	830
SCOTLAND	0	0	0	945
SCOTT	0	41,317	0	7,718
SHANNON	0	0	0	1,492
SHELBY	0	0	0	1,361
STODDARD	1,384,304	0	0	5,663
STONE	388,655	0	0	2,152

County	MSW	Tires		
		Unpermit landfills	Permit landfills	Annual disposal
	Million Btus annually			
SULLIVAN	0	0	0	1,240
TANEY	0	0	0	5,010
TEXAS	0	0	0	4,209
VERNON	0	3,940	0	3,732
WARREN	0	588	0	3,829
WASHINGTON	256,575	5,782	0	3,994
WAYNE	0	13,818	0	2,262
WEBSTER	0	10,682	0	4,656
WORTH	0	0	0	478
WRIGHT	1,990,757	0	0	3,285
St Louis City	1,589,529	0	0	77,750
Total	35,595,924	909,385	313,992	1,001,359
% of total Million BTUs	8.70	0.22	0.08	0.24